

ON SOME SMALLER FOSSILS FROM THE RED LIMESTONE AT GRANGE BURN, NEAR HAMILTON, WITH A NOTE ON A NEW SPECIES OF BOLIVINA.

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IN Memoir No. 5 of the Melbourne National Museum † I discussed the stratigraphical relationships of the limestone at Grange Burn and Muddy Creek to the adjacent strata, and also pointed out the significance of the fossil fauna of this limestone. It contains, amongst other fossils, such typical Janjukian forms as *Linthia* of the *L. mooraboolensis* type and *Lepidocyclina tournoueri*, which are especially representative of the Batesford and Moorabool Valley Tertiaries. The intermediate position of this limestone, between the Balcombian below and the Kalimnan above, was shown in the work mentioned by data from river cliff sections.

The object of the present note is to place on record the results of a detailed examination of the finer material of the above-mentioned *Lepidocyclina* limestone, which lends further support to the view that it belongs to the Batesford horizon and represents a similar phase of marine conditions of the Victorian Tertiaries.

This limestone, occurring in the bluff opposite Mr. Henty's homestead of "The Caves," is of an ochreous brown colour, but farther down the Grange Burn, towards its junction with Muddy Creek, it is of a reddish or pink tint. Some of the material obtained opposite Henty's was weathered, and occurred on ledges and in pockets of the limestone, and to obtain the specimens it required no treatment beyond washing, drying, and sifting.

The following is a list of the smaller fossils obtained from the weathered limestone. The species previously recorded from Batesford, ‡ with which locality the Grange Burn occurrence is stratigraphically associated, are marked *.

FORAMINIFERA.—*Bolivina hentyana*, sp. nov., **Nodosaria obliqua*, L., sp., **Marginulina costata*, Batsch, sp., **Polymorphina elegantissima*, Parker and Jones, **P. regina*, Brady, Parker and Jones, **Sagraina raphanus*, P. and J., **Truncatulina ungeriana*, d'Orb., sp., **T. refulgens*, Montf., sp., **Pulvinulina elegans*, d'Orb., sp., **Rotalia calcar*, d'Orb., sp., **Gypsina howchini*, Chapm., **Amphistegina lessonii*, d'Orb., **Operculina complanata*, Defr., **O. complanata*, var. *granulosa*, Leymerie, **Lepidocyclina*

† July, 1914, pp. 45 and 47.

‡ See "A Study of the Batesford Limestone," Proc. Roy. Soc., Vict., vol. xxii. (N.S.), part ii., 1910, pp. 302-308.

tournoveri, Lemoine and Douvillé, **L. martini*, Schlumberger, **L. marginata*, Michelotti, sp.

CORALS.—**Mopsea hamiltoni*, Thomson, sp.

ECHINOIDS.—Spines of a cidaroid, indet.

VERMES.—*Serpula*, sp.

POLYZOA.—*Cellaria rigida*, var. *venusta*, MacGill, *Macropora clarkei*, T.-Woods, sp., *Lekythopora*, sp., near *L. kitsoni*, Maplestone, **Smittia tatei*, T.-Woods, sp., **Porina gracilis*, Milne Edwards, sp., *Retepora*, sp., *Entalophora australis*, Busk., *Crisia*, sp.

OSTRACODA.—**Bairdia amygdaloides*, G. S. Brady, *Cythere postdeclivis*, Chapm.

FORAMINIFERA.

The only species of the foraminifera new to the Batesford fauna are *Bolivina hentyana*, *Marginulina costata*, and *Sagraina raphanus*. Species which are distinctly typical of the Batesford fauna are the lepidocycline foraminifera and *Gypsina howchini*. The former, although found occasionally in lower strata at Muddy Creek, particularly dominate this horizon. *Lepidocyclina* limestone has also been noted from Keilor and Cape Schanck. *Gypsina howchini*, besides occurring at Batesford, has recently been obtained from Janjukian strata in the Mallee bores.



BOLIVINA HENTYANA, sp. nov. Tertiary (Janjukian). Limestone bluff, opposite Henty's, Grange Burn. x 26.

Description of **BOLIVINA HENTYANA**, sp. nov., † (fig.)

Test long ovate, moderately broad at the oral extremity

† Named in honour of Lieut. E. E. Henty, who fell at Gallipoli on 7th August this year, and in recognition of his helpfulness to the writer whilst on geological work at Hamilton in 1912.

and tapering to a moderately sharp apex at the aboral end; compressed, with rounded edges. Sutures textularian, fairly distinct; chambers moderately long, sutures oblique. Lateral faces slightly depressed along the median axis and ornamented with numerous fine, raised striæ, more or less parallel.

Length, 2.07 mm.; greatest width, near oral end, .73 mm.; thickness of test, .23 mm.

Observations.—At first sight this ornamental little species suggested the complanate form of *Polymorphina* from the English Crag (Pliocene), described by Searles Wood as *P. frondiformis*.^{*} A close examination, however, shows our species to belong to the genus *Bolivina*, since the chambers are regularly disposed in the textularian manner, and the aperture is excentric. The nearest analogue is *Bolivina nobilis*, Hantken,[†] a species which is found throughout our Tertiary beds and is even living at the present day in the Southern Ocean. The new species is extremely broad as compared with von Hantken's form, whilst the striæ are more pronounced, closer together, and continuous from end to end of the test.

Holotype in the National Museum.

POLYZOA.

A species occurring in this series of fossils worthy of special notice is *Lekythopora*. Its nearest related form is *L. kitsoni*, Maplestone, which was described from the Janjukian of Waurm Ponds. The present form differs in the radiating arrangement of the zooecia.

OSTRACODA.

Bairdia amygdaloides is still found living in Bass Strait, and its distribution extends up to Port Jackson and into the South Pacific, but it appears to be confined to the waters of the southern hemisphere. The species is found in the fossil condition in Janjukian (Miocene) strata at Batesford, and in the Miocene and Lower Pliocene of the Mallee bores.

Cythere postdeclivis is of especial interest, since it was only recently described from the Miocene, and probably Lower Pliocene, beds of the Mallee bores.

^{*} See Jones, Parker, and Brady, "Mon. Foram. Crag," 1866, Appendices I. and II. (footnotes), pl. i., figs. 62, 63; pl. iv., figs. 11-14.

[†] Mittheil, "Jahrb. d. k. ung. Geol. Anstalt," vol. iv., 1875, p. 65, pl. xv., figs. 4a, b; Chapman, Journ. Linn. Soc., Lond., Zool., vol. xxx., 1907, p. 32, pl. iv., fig. 81. *Id.*, "Biol. Results F.I.S. *Endeavour*," vol. iii., part 1, 1915, p. 19.